

Having thus described the preferred embodiment, we now claim:

1. A method of rendering a color image with a plurality of separations on an output device, with a halftone process using a single screen for said plurality of separations, wherein the screen is comprised of a plurality of pixel locations with associated threshold values and the image is comprised of a plurality of separation values, the method comprising steps of:

rendering a first one of the plurality of separations in accordance with the screen, wherein the plurality of pixel locations are turned on or off at a given pixel location based on a comparison of the image separation value at that pixel with the screen threshold value,

rendering a next one of the color separations in accordance with the rendering of the first separation and the screen, wherein for constant image separation values, pixel locations are turned on for the separation at pixel locations disposed in a highest available luminance region having a lowest available threshold value; and

when the rendering of the first and next ones of the color separations comes within a preselected number of threshold values of filling the pixels of a luminance region, continuing rendering includes overlapping the luminance region with a next luminance region whereby color inaccuracy due to separation misalignment is diminished for improved color registration latitude.

2. The color rendering method in claim 1 wherein the halftone screen is a stochastic screen

3. The color rendering method as defined in claim 2 wherein the preselected number of threshold values is based upon an empirical determination of accuracy of inter-separation alignment of the output device.

4. The method in claim 3, wherein the renderings are printings.

5. The color rendering method as defined in claim 3, wherein the renderings are displays on a screen.

6. The color rendering method as defined in claim 3 wherein the overlapping comprises a fraction of the continuing rendering of the screen.

5 7. The color rendering method as defined in claim 6 wherein the fraction comprises fifty percent.

8. The color rendering method as defined in claim 1 wherein the overlapping begins at a lowest threshold value of the first one of the separations.

10 9. In a color printing system, a method of printing a color document with a halftone process using a single screen for a plurality of color separations wherein the screen is comprised of a plurality of pixel locations associated with successive threshold values, the method comprising steps of:

15 printing a first one of the plurality of color separations in accordance with the screen, wherein a corresponding first set of screen pixel locations associated with a first set of threshold values are filled by the first one of the color separations; and,

printing a next color separation in accordance with the screen, wherein a corresponding second set of screen pixel locations are filled by the next separation, the
20 second set having threshold values successive to the first set of threshold values, and before the printing of the next color separation fills the screen, overlapping the printing of the next color separation with the first one of the separations at a portion of the first set of screen pixel locations.

25 10 The color printing method as defined in claim 9 wherein the single screen comprises a stochastic screen representing a set of pixel elements having a range of the successive threshold values, and the printing of the next color separation comprises filling second pixel elements having next successive threshold values to threshold values associated with pixel locations filled by the printing of the first one, and wherein the overlapping begins
30 within a predetermined number of available threshold values from the filling of the screen.

11. The color printing method as defined in claim 10 wherein the overlapping comprises an overlap filling first made at a pixel locations disposed in a highest available luminance region having a lowest available threshold value.

5 12. The color printing method as defined in claim 10 wherein the overlapping comprises alternatively assigning pixel locations to the next color separation from the first set of pixel locations filled by the first one of the color separations and the available threshold values.

10 13. A rendering apparatus for a color image represented in a halftone process by a plurality of separations, comprising:
a halftoning screen generator for producing a screen having threshold values at pixel locations, wherein the values can be applied to contone image signals to derive a binary image signal suitable to drive the apparatus; and,
15 a processor for rendering the color separations in accordance with the screen, wherein for constant image separation values, pixel locations are turned on for a selected separation at the pixel locations disposed in a highest available luminance region having a lowest available threshold value for a predetermined number of available threshold values less than a complete filling of the screen, and thereafter an overlap filling occurs for a portion
20 of the turned on pixel locations.

14. The rendering apparatus as defined in claim 13 wherein the screen comprises a stochastic screen.

25 15. The rendering apparatus as defined in claim 13 wherein the processor renders the overlap filling by alternatively assigning open pixel locations associated with available threshold values and turned-on pixel locations associated with a rendered separation.

30 16. A method of rendering a color image with a plurality of separations on an output device, with a halftone process using a single screen for said plurality of separations, wherein the screen is comprised of a plurality of pixel locations with associated

threshold values and the image is comprised of a plurality of separation values, the method comprising steps of:

rendering the colors successively in a predetermined order until the sum of the colors reaches a threshold value, and

when the sum of the colors exceeds the threshold value, overlapping at least two of the separations.

17. The method of claim 16 wherein the screen comprises a plurality of luminance regions and when an increase in the screen approaches within a threshold of filling the pixels of one of the luminance regions, continued rendering includes beginning to fill the next one.

18. The method of claim 17 wherein calculating the threshold value based on the values in each of the separations.